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TWO NEW SPECIES OF *HETEROSPILUS* (HYMENOPTERA: BRACONIDAE) FROM MEXICO BEING INTRODUCED AGAINST THE COTTON BOLL WEEVIL, *ANTHONOMUS GRANDIS* (COLEOPTERA: CURCULIONIDAE)

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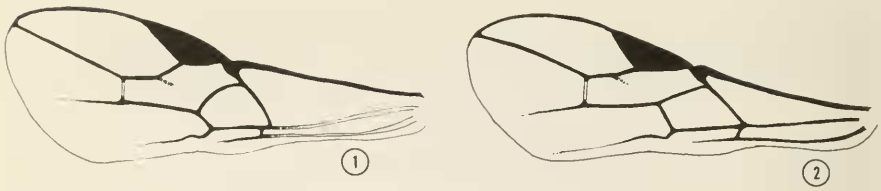
Abstract.—Descriptions are provided for two new species of the braconid genus *Heterospilus*: ***annulatus***, n. sp., from Corregidora, Tabasco, Mexico; and ***megalopus***, n. sp., from Cardenas, Tabasco, Mexico. Both species have been reared from the cotton boll weevil, *Anthonomus grandis* Boheman, and possibly from its close relative *A. hunteri* Burke and Cate, and are being cultured and released in Texas.

The genus *Heterospilus* Haliday belongs in the braconid subfamily Doryctinae, most species of which parasitize wood-boring beetle larvae. However, species of *Heterospilus* exhibit an unusually wide range of hosts covering three insect orders: Coleoptera (Anobiidae, Bostrichidae, Bruchidae, Buprestidae, Cerambycidae, Curculionidae, Languriidae, Mordellidae, Scolytidae); Lepidoptera (Gelechiidae, Incurvariidae, Olethreutidae, Pyralidae); and Hymenoptera (Cephidae, Tenthredinidae). In nearly all of these records, the hosts have cryptic boring habits in stems. In addition there are two unusual records: one species is parasitic on larvae of the genus *Microstigmus* (Hymenoptera: Sphecidae); the other is recorded from galls of *Eurosta solidaginis* (Fitch) (Diptera: Tephritidae) on ragweed. In spite of this diverse host range, the genus is morphologically homogeneous. The single character that distinguishes *Heterospilus* from all but one of the other genera in the Doryctinae is the absence or weakness of the first intercubital vein of the forewing, thus making the first and second cubital cells confluent (Fig. 1). The genus has not been studied in the Western Hemisphere, but apparently there are several species groups based on a variety of other characters. None of these groups seems to be correlated with a particular host group from the above list.



Figs 1, 2. Wings of *Heterospilus*. 1, *H. megalopus*. 2, *H. annulatus*.

The two species described here are being studied by James R. Cate, B. J. Porter, and associates at Texas A&M University, College Station. The species were collected at localities in the state of Tabasco, Mexico, where they were definitely reared from larvae of *Anthonomus grandis* Boheman in *Hampea nutrica* Fryxell. In addition to the specimens examined by me, both species were collected at other localities in the state of Campeche where they were reared from what was assumed to be *A. hunteri* Burke and Cate (J. R. Cate, personal communication). However, since there is some difficulty in distinguishing larval remains of *A. grandis* from those of *A. hunteri*, which is restricted to *Hampea trilobata* Standley, I therefore assume that the host of specimens of the *Heterospilus* species reared from *Anthonomus* on *Hampea trilobata* in Campeche is *A. hunteri*.

Both species of *Heterospilus* have been released in areas around College Station, Brownsville, Elsa, and Rosebud, Texas.

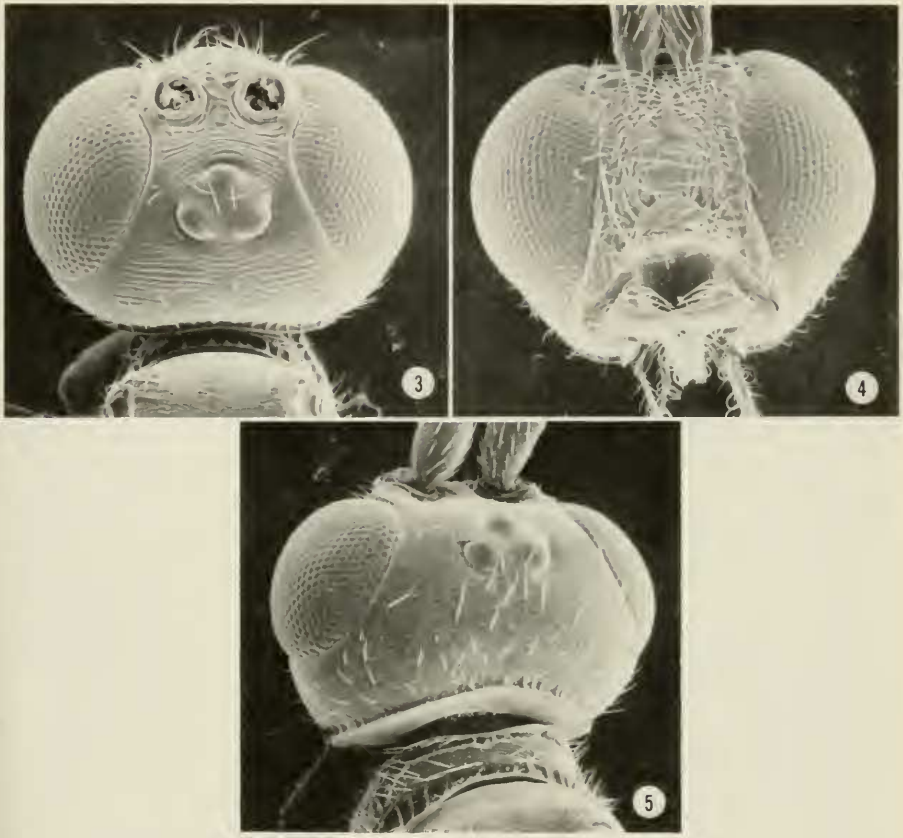
Heterospilus annulatus Marsh, New Species

Figs. 2, 5, 6, 7, 10, 11

Female.—Length of body, 2.5–3.5 mm; ovipositor, 0.50–0.75 mm. Color: Head dark brown, face and mandibles often light brown to honey yellow, palpi white; scape and pedicel yellow with longitudinal brown stripe laterally, flagellum brown except flagellomeres 16–19 which are white, numbers 16 and 19 sometimes partially to completely brown; thorax dark brown, mesonotum, scutellum, propodeum, and anterior part of mesopleuron frequently light brown; abdomen dark brown, terga 1 and 2 yellow medially, terga 3–7 sometimes light brown, entire venter yellow; legs light yellow, coxae and trochanters nearly white, apical tarsomeres brown; tegula yellow, wing base white.

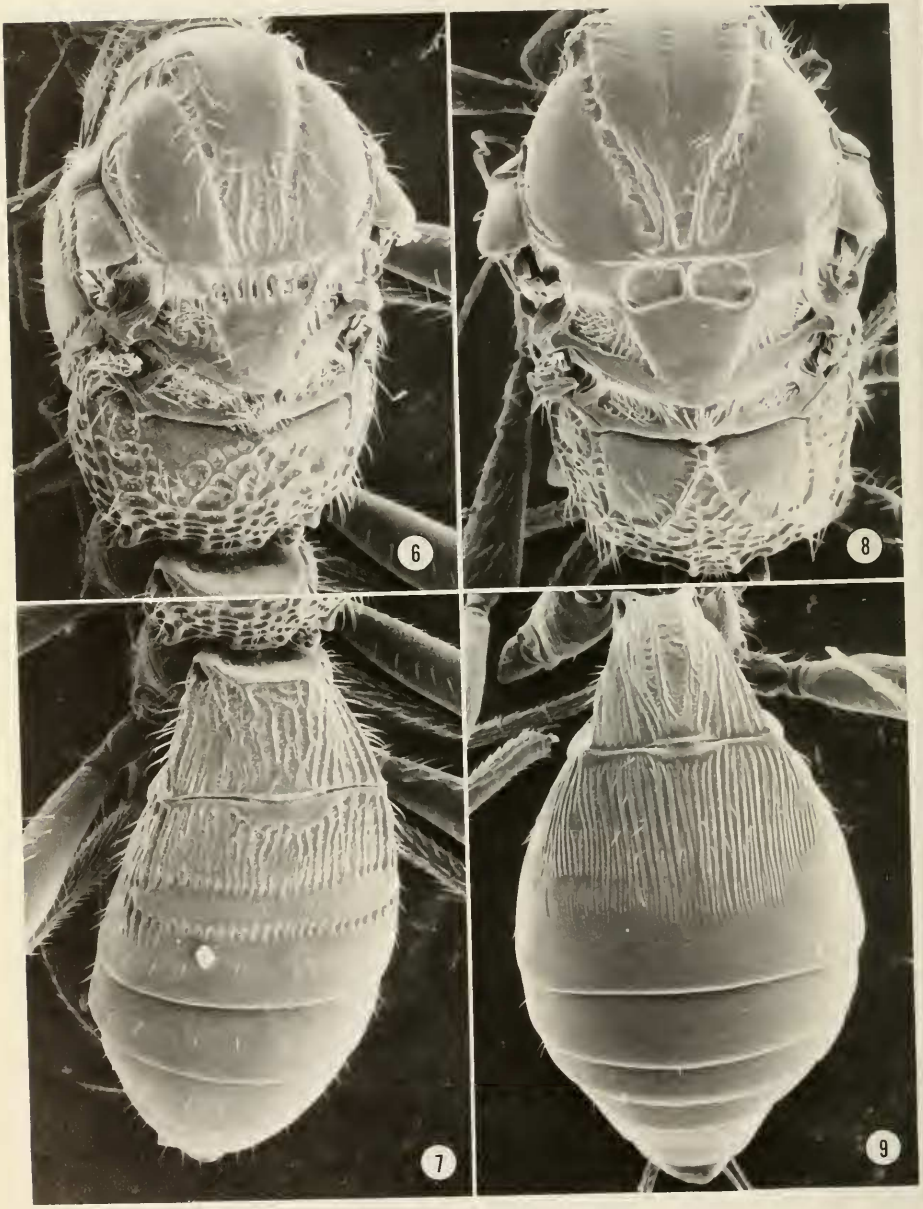
Head: Coriaceous,[1] vertex sometimes imbricate behind ocelli (Fig. 5), face often rugulose; eyes large, malar space ¼ eye height; ocellocular dis-

[1] All terms for sculpturing are based on Harris, 1979, Calif. Dep. Food Agric., Entomol. Occas. Pap. No. 28, 31 pp.



Figs. 3–5. Heads of *Heterospilus*. 3, *H. megalopus*, dorsal view. 4, *H. megalopus*, anterior view. 5, *H. annulatus*, dorsal view.

tance 2.5× diameter of lateral ocellus; antenna with 24–27 flagellomeres. Thorax: Mesonotal lobes (Fig. 6) coriaceous, notauli scrobiculate and meeting posteriorly in a wide porcate area, scutellar disc coriaceous but sometimes nearly smooth in small specimens, scutellar furrow with 4 or 5 cross carinae; mesopleuron (Figs. 10, 11) coriaceous, subalar furrow scrobiculate; propodem areolate-rugose with 2 small triangular coriaceous areas at base. Abdomen (Fig. 7): First tergum short and broad, 1.5× as wide at apex as long, costate-rugose, strongly arched with anterior elevation smooth; terga 2+3 with 2 transverse scrobiculate furrows, costate-rugose on basal ½ before 1st transverse furrow, remainder coriaceous; remainder of terga coriaceous, terga 4 and 5 with transverse scrobiculate furrow at base (usually hidden under apex of preceeding tergum); ovipositor about as long as terga



Figs. 6–9. Thoraces and abdomens of *Heterospilus*, dorsal views. 6, 7, *H. annulatus*. 8, 9, *H. megalopus*.

Figs. 10–13. Thoraces of *Heterospilus*, lateral views. 10, 11, *H. annulatus*. 12, 13, *H. megalopus*.

1–3 or about ⅓ as long as forewing. Wings (Fig. 2): First segment of radius ⅔ length of 2nd segment, 2nd segment of radius ⅔ length of 2nd intercubitus, 1st intercubitus indicated only by light infuscation near radius; nervulus slightly postfurcal.

Male.—Essentially similar to female; length of body 2–3 mm; antenna with 22–26 flagellomeres; stigma in hindwing about as long as its distance from wing base, broad, greater than ½ width of wing at stigma location.

Holotype.—♀, Corregidora, Tab., Mexico, August 1979, J. R. Cate collector, ex. *Anthonomus grandis*. Deposited in USNM (National Museum of Natural History, Washington, D.C.).

Paratypes.—24 ♀, 25 ♂, same data as type. Deposited in USNM and Texas A&M University.

Remarks.—This species is distinguished from all other described U.S. species by the white annulus on the antenna in both sexes. It is similar to *annulicornis* Muesebeck from Brazil, which also has a white annulus on the

female antenna, but *annulatus* is distinguished from *annulicornis* by the yellow and brown markings on the abdomen and thorax, the brown stripe on the scape and pedicel, and by the fact the male of *annulicornis* does not have the white annulus on the antenna.

This species also is apparently similar to *ashmeadi* Shenefelt but the unique holotype is missing both antennal flagella and some characters are obscured by glue. However, *ashmeadi* appears to have a smooth mesonotum, smooth notauli, and is entirely dark brown or black.

Heterospilus megalopus Marsh, New Species

Figs. 1, 3, 4, 8, 9, 12, 13

Female.—Length of body, 3.5 mm; ovipositor, 1.25 mm. Color: Head honey yellow, antenna yellow, apical flagellomeres light brown, palpi white; thorax brown, black markings around scutellum, prothorax sometimes lighter brown; abdomen brown, often with dark brown or black on abdominal terga 2–4, venter honey yellow; tegula and wing base yellow; legs light yellow, nearly white.

Head: Vertex and frons strigate (Fig. 3), face rugulose, temples smooth; eyes large (Fig. 4), malar space about 1/12 eye height, temples about 1/4 eye width, face narrow, about 3/4 eye width; ocellocular distance equal to diameter of lateral ocellus; antenna with 26 flagellomeres. Thorax: Mesonotal lobes (Fig. 8) coriaceous, notauli scrobiculate, meeting posteriorly in a wide rugose area; scutellar disc smooth, scutellar furrow broad and with one median cross carina; mesopleural disc (Figs. 12, 13) smooth, subalar furrow scrobiculate; propodeum rugose with 2 large triangular smooth areas at base. Abdomen (Fig. 9): First tergum slightly longer than apical width, costate; terga 2+3 costate on basal 3/4, smooth on apical 1/4, transverse sutures at most indicated by weak lines laterally, remainder of abdominal terga smooth; ovipositor about 1/2 as long as abdomen or slightly less than 1/2 of forewing length. Wings (Fig. 1): First segment of radius equal to 2nd, 2nd segment of radius slightly longer than 1st intercubitus; nervulus postfurcal by about its own length.

Male.—Essentially as in female; length of body, 2.5–3.5 mm; antenna with 22–24 flagellomeres; stigma in hindwing as long as its distance from wing base, broad, nearly as broad as wing base near stigma.

Holotype.—♀, Cardenas, Tab., Mexico, July 1979, J. R. Cate collector, ex *Anthonomus grandis*. Deposited in USNM.

Paratypes.—3 ♀, 16 ♂, same data as holotype. Deposited in USNM and Texas A&M University.

Remarks.—This species is similar to *fasciatus* Ashmead from St. Vincent and Grenada because of the single carina in the scutellar furrow, but *megalopus* is distinctive by its large eyes, the heights of which are nearly 12 times as long as the malar space.